

Eating Habits a Risk Factor to Peptic Ulcer

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Abstract

The dietary habits influencing the risk of acquisition of *Helicobacter pylori* infection resulting in peptic ulcer are not well established. 30 patients requiring an endoscopy for the evaluation of gastrointestinal symptoms had demographic and dietary data collected and biopsy specimens of the gastric antrum stained for the identification of *H. pylori*. The 50% infected subjects were significantly older than the uninfected ones with no difference in gender, crowding, source of drinking water, or exposure to domestic animals. Increased prevalence of infection was associated with increased consumption of food from street vendors, and decreased consumption of fruits in the subgroup that denied consuming food from street vendors. No association was found with consumption of fish, chicken, beef, beans, vegetables, rice, cheese, milk, and unboiled water. These findings support the role of food prepared under unhygienic conditions as a probable mechanism of transmission of *H. pylori* in developing countries.

Key words: eating habits, endoscopy, h.pylori, NSAIDs, peptic ulcer.

INTRODUCTION

A peptic ulcer, also known as, PUD or peptic ulcer disease, is an ulcer (defined as mucosal erosions equal to or greater than 0.5 cm) of an area of the gastrointestinal tract that is usually acidic and thus extremely painful. As many as 70-90% of ulcers are associated with *Helicobacter pylori*, a spiral-shaped bacterium that lives in the acidic environment of the stomach; however, only 40% of those cases go to a doctor. Ulcers can also be caused or worsened by drugs such as aspirin and other NSAIDs. (1)

Complications: Most ulcers can be cured without complications. However, in some cases, peptic ulcers can develop potentially life-threatening complications, such as penetration, perforation, bleeding (hemorrhage), and obstruction. (2)

Penetration: An ulcer can go through (penetrate) the muscular wall of the stomach or duodenum (the first segment of the small intestine) and continue into an adjacent organ, such as the liver or pancreas. (3) This penetration causes intense, piercing, persistent pain, which may be felt outside of the area involved—for example, the back may hurt when a duodenal ulcer penetrates the pancreas. (4,5) The pain may intensify when the

person changes position. If drugs do not heal the ulcer, surgery may be needed.

Perforation: Ulcers on the front surface of the duodenum, or less commonly the stomach, can go through the wall, creating an opening (perforation) to the free space in the abdominal cavity. The resulting pain is sudden, intense, and steady. The pain rapidly spreads throughout the abdomen. The person may feel pain in one or both shoulders, which may intensify with deep breathing. (6) Changing position worsens the pain, so the person often tries to lie very still. The abdomen is tender when touched, and the tenderness worsens if a doctor presses deeply and then suddenly releases the pressure. (Doctors call this rebound tenderness.) Symptoms may be less intense in older people, in people taking corticosteroids, or in very ill people. A fever indicates an infection in the abdominal cavity. If the condition is not treated, shock may develop. This emergency situation requires immediate surgery and intravenous antibiotics. (7)

Bleeding: Bleeding (hemorrhage) is a common complication of ulcers even when they are not painful. Vomiting bright red blood or reddish brown clumps of partially digested blood that look like coffee grounds and passing black or obviously bloody stools can be symptoms of a bleeding ulcer. However, small amounts of

blood in the stool may not be noticeable but, if persistent, can still lead to anemia. Bleeding may result from other digestive conditions as well, but doctors begin their investigation by looking for the source of bleeding in the stomach and duodenum. Unless bleeding is massive, a doctor performs an endoscopy (an examination using a flexible viewing tube). If a bleeding ulcer is seen, the endoscope can be used to cauterize it (that is, destroy it with heat). (8, 9) A doctor may also use the endoscope to inject a material that causes a bleeding ulcer to clot. If the source cannot be found and the bleeding is not severe, treatments include taking ulcer drugs, such as histamine-2 (H₂) blockers or proton pump inhibitors. The person also receives intravenous fluids and takes nothing by mouth, so the digestive tract can rest. If these measures fail, surgery is needed.

Obstruction: Swelling of inflamed tissues around an ulcer or scarring from previous ulcer flare-ups can narrow the outlet from the stomach or narrow the duodenum. A person with this type of obstruction may vomit repeatedly—often regurgitating large volumes of food eaten hours earlier. A feeling of being unusually full after eating, bloating, and a lack of appetite are symptoms of obstruction. Over time, vomiting can cause weight loss, dehydration, and an imbalance in body chemicals (electrolytes). Treating the ulcers relieves the obstruction in most cases, but severe obstructions may require endoscopy or surgery.

Cancer: People with ulcers caused by *Helicobacter pylori* have 3 to 6 times the chance of developing stomach cancer later in life. There is no increased risk of developing cancer from ulcers that have other causes.

Diagnosis: A doctor suspects an ulcer when a person has characteristic stomach pain. Sometimes the doctor simply treats the person for an ulcer to see whether the symptoms resolve, which suggests that the person had an ulcer that has healed. Tests may be needed to confirm the diagnosis, especially when symptoms do not resolve after a few weeks of treatment, or when they first appear in a person

who is over age 45 or who has other symptoms such as weight loss, because stomach cancer can cause similar symptoms. (10,11) Also, when severe ulcers resist treatment, particularly if a person has several ulcers or the ulcers are in unusual places, a doctor may suspect an underlying condition that causes the stomach to overproduce acid. To help diagnose ulcers and determine their cause, the doctor may use endoscopy (a procedure performed using a flexible viewing tube) or barium contrast x-rays (x-rays taken after a substance that outlines the digestive tract has been swallowed). Endoscopy is usually the first diagnostic procedure ordered by a doctor. Endoscopy is more reliable than barium contrast x-rays for detecting ulcers in the duodenum and on the back wall of the stomach; endoscopy is also more reliable if the person has had stomach surgery. (12) However, even a highly skilled endoscopist may miss a small number of gastric and duodenal ulcers. With an endoscope, a doctor can perform a biopsy (removal of a tissue sample for examination under a microscope) to determine if a gastric ulcer is cancerous and to help identify the presence of *H. pylori* bacteria. An endoscope also can be used to stop active bleeding and decrease the likelihood of recurring bleeding from an ulcer. Barium contrast x-rays of the stomach and duodenum (also called a barium swallow or an upper gastrointestinal series) can help determine the severity and size of an ulcer, which sometimes cannot be completely seen during an endoscopy because it is further down the duodenum or hidden by a fold.

Peptic ulcer treatment

Most ulcers can be healed with medications. Surgery is rarely needed, except when complications have developed. Identify cause of ulcer — The initial step in treating an ulcer is to identify the cause. NSAIDs should be stopped, regardless of the cause. People who have *H. pylori* are treated with antibiotics and a medication that reduces acid production. Treating *H. pylori* — No single drug effectively cures *H. pylori* infection. Treatment involves taking several medications for 7 to 14 days.

- Most of the treatment regimens include a medication called a proton pump inhibitor. This medication decreases the stomach's production of acid, which allows the tissues damaged by the infection to heal. Examples of proton pump inhibitors include lansoprazole (Prevacid®), omeprazole (Prilosec®), pantoprazole (Protonix®), rabeprazole (AcipHex®) and esomeprazole (Nexium®).
- Two antibiotics are generally recommended; this reduces the risk of treatment failure and antibiotic resistance. Although the optimal treatment regimen continues to be investigated, the American College of Gastroenterology has recommended four regimens that use a combination of at least three medications. These regimens successfully cure infection in up to 90 percent of people. For the treatment to be effective, the entire course of all medications must be taken.(13,14)Side effects — Up to 50 percent of people have side effects of H. pylori treatment. Side effects are usually mild, with fewer than 10 percent of patients stopping treatment because of side effects. For those who do experience side effects, it may be possible to make adjustments in the dose or timing of medication. Some of the most common side effects are described below.
- Some of the treatment regimens use a medication called metronidazole (Flagyl®) or clarithromycin. These medications can cause a metallic taste in the mouth.
- Alcoholic beverages (e. g., beer, wine) should be avoided while taking metronidazole; the combination can cause skin flushing, headache, nausea, vomiting, sweating and a rapid heart rate.
- Bismuth, which is contained in some of the regimens, causes the stool to become black and may cause constipation.
- Many of the regimens cause diarrhea and stomach cramps.

Ways to help ulcers heal — A number of other measures help to ensure ulcer healing and prevent ulcer recurrence.

- Stop smoking.
- Avoid NSAIDs if possible. All medications should be reviewed with a health care provider to make sure that they do not contain NSAIDs. If it is necessary to continue NSAIDs, one or more medications may be added to aid in ulcer healing and prevent recurrence.
- If you had complications from your ulcer (such as bleeding or perforation), you should be retested for H. pylori to make sure that antibiotic therapy was successful. Although controversial, most experts recommend that a medication to reduce acid secretion is continued, even after a complicated ulcer has healed.
- Caffeine-containing foods (such as coffee, tea, and chocolate) stimulate acid secretion and may worsen ulcer pain in some people.(15)
- Antacids are permissible during ulcer treatment if needed, although antacids should not be used within one hour before or two hours after taking ulcer medications since they can interfere with their absorption.(16)
- Although small amounts of alcohol are probably safe, we recommend avoiding alcohol until the ulcer has had time to heal. Excessive use of alcohol impairs ulcer healing and has a number of other serious health consequences. "Excessive" alcohol use is defined as more than 14 alcoholic beverages per week.
- Efforts to reduce stress can benefit your overall health and may have a small benefit in healing ulcers. However, most ulcers heal with medications, even in people who continue to live a stressful life.
- Herbal medications and supplements (such as licorice, marshmallow, and glutamine) probably have no role in the treatment of peptic ulcers. In addition, the manufacture of these treatments is not regulated and their safety and efficacy are not known.

Peptic ulcers

Duodenal ulcers — People with uncomplicated duodenal ulcers should have follow-up testing after treatment, especially if symptoms recur or do not improve. Follow up testing is also recommended for people who have had complications (such as bleeding or perforation) to ensure that *H. pylori* has been successfully cured.(17,18)
Gastric ulcers — People with gastric ulcers usually undergo a repeat endoscopy to ensure that the ulcer has healed and to ensure that the ulcer does not contain cancer cells. Long-term treatment to suppress stomach acid is usually recommended if a person has a high risk of ulcer recurrence (e.g., a history of ulcer complications or frequent recurrences).(19,20) People with ulcers due to *H. pylori* are unlikely to develop another ulcer if NSAIDs are avoided.

The purpose of the current clinical study was to examine the extent to which eating habits can lend a hand in occurrence of peptic ulcer bleeding and its treatment with modern strategies. The following issues were addressed:

1. Does a balanced and hygienic food offer any safety from ulcer compared to the junk and un-hygienic food in people?
2. How do different foods affect the intragastric acidity in peptic ulcer?
3. What are the important risk factors and their possible concurrence in people?
4. What kind of foods can contribute in developing ulcer?

MATERIALS AND METHODS

The study population has been previously described briefly, between June 2010 and July 2010, patients were enrolled attending the services hospital Lahore, a tertiary-hospital of Lahore. The population served is composed by poor inner city people of native Lahore and near by people. The study was approved by the Ms of the hospital. Consent was obtained orally from the attendants of all participating patients, or from the patient himself. Demographic and dietary data were also obtained from the participating subjects including age, gender, size of the household, contact with domestic

animals (dogs, cats, birds, others), source of drinking water (intra-domiciliary versus extra-domiciliary), and the frequency of consumption (never, once a month, once a week, and more than once a week) of the following items: fish, chicken, beef, vegetables, beans, fruits, rice, cheese, milk, chili, unboiled water, and food from street vendors. The information was collected using a standardized questionnaire during the clinical visit. As explained to the participants, the dietary data provided was expected to represent current practices.

Comparison of epidemiologic characteristics between *H. pylori*-infected and uninfected subjects was done. The association between increasing exposure to dietary factors and the prevalence of infection (dose-response) was analyzed. Since age increases the prevalence of infection and might also influence the consumption of some of the food items, the dietary variables significantly associated with *H. pylori* infection were then re-analyzed adjusting for age by stratification.

RESULTS

Of the 30 patients originally reported, one was excluded because of faulty dietary information leaving 29 evaluable patients. Their mean age was 41 (range 17–72) years and 58% were males. The reasons for endoscopic examinations were abdominal pain (10), gastrointestinal bleeding (2), vomiting (7), esophageal dilatation (3), caustic ingestion (6), anemia (3) and others (1). Of the 29 evaluable patients, 75% were infected with *H. pylori* as determined by histology. The infected subjects were significantly older than the uninfected ones. Otherwise, there was no difference in terms of gender, crowding (measured as the number of occupants per room in the household), source of drinking water (intradomiciliary versus extradomiciliary) or exposure to domestic animals.

Table 1 shows the proportion of infected individuals according to their degree of consumption of different food items. A significant association was found between consumption of food from street vendors and an increased prevalence of *H. pylori* infection,

and a marginal association was found with consumption of chili.

Because of the way the questionnaire had been designed, the dietary information did not separate the food items consumed specifically from street vendors; thus, it was not possible to evaluate their possible association with transmission of the infection. On the other hand, a analysis of food consumption among subjects denying eating food from street vendors (Table 2) showed a significant

negative association (protective effect) between consumption of fruits and infection rate .

The results of age-adjusted analyses are shown in Table 3. Consumption of food from street vendors remained significantly associated with *H. pylori* infection , Consumption of fruits remained protective for the group denying eating food from street vendors , and consumption of chili became non-significant.

TABLE I

Prevalence rates of *Helicobacter pylori* infection according to increasing consumption of food items*

Food item	Never (%)	Once/month (%)	Once/week (%)	>Once/week (%)
Food from street vendors	(38)	(65)	(75)	----
Chili	(45)	(64)	(80)	----
Unboiled water	(38)	(64)	(44)	(100)
Popsicles	(44)	(52)	(67)	(50)
Chicken	(100)	(25)	(50)	(51)
Fish	(57)	(46)	(50)	(100)
Beef	(33)	(54)	(47)	(50)
Cow's milk	(47)	(38)	(75)	(29)
Cheese	(45)	(53)	(53)	(0)
Fruits	(100)	(31)	(58)	(38)
Vegetables	---	(43)	(49)	(56)
Rice	---	(25)	(51)	(50)
Beans	(67)	(46)	(51)	(67)

TABLE II

Prevalence rates of *Helicobacter pylori* infection according to increasing consumption of food items (includes only the group denying eating food from street vendors)*

Food item	Never (%)	Once/month (%)	Once/week (%)	≥Once/week (%)
Chili	(36)	(67)	(0)	--
Unboiled water	(33)	(47)	(44)	---
Popsicles	(37)	(44)	(50)	(0)
Chicken	(100)	(33)	(36)	(31)
Fish	(50)	(34)	(35)	(100)
Beef	(25)	(37)	(43)	(50)
Cow's milk	(36)	(50)	(75)	(17)
Cheese	(39)	(37)	(44)	(0)
Fruits	(100)	(50)	(46)	(18)
Vegetables	---	(40)	(33)	(53)
Rice	---	(33)	(37)	(39)
Beans	(67)	(29)	(39)	(60)

TABLE IIIDietary factors and *Helicobacter pylori* infection, crude and age adjusted Analyses*

<i>Food item</i>	<i>Unadjusted</i>	<i>Adjusted</i>
FOOD FROM STREET		
Never	1	1
Once/month	3	4
Once/week	5	4
CHILLI		
Never	3	3
Once/month	2	1
Once/week	5	4
FRUITS¶		
Never	Undefined	Undefined
Once/month	2	3
Once/week	2	2
>Once/week	3	3

* includes only the group denying eating food from street vendors

DISCUSSION

The overall rate of *H. pylori* infection was 50% in this cohort of Peruvian children as has been previously described. As expected, there was an increased prevalence of infection with age. This is a well-described phenomenon the meaning of which, however, remains unclear. Obviously, aging does not cause infection but there must be some external (maybe environmental) factor(s) to which the subject is either constantly or increasingly exposed with age. Evaluation of dietary factors suggested that eating food from street vendors might be implicated in the acquisition of the infection. This variable had a dose-response effect that remained significant even after adjustment for age. The unhygienic conditions in which food is prepared and dispensed by street vendors are well known and have been previously implicated in outbreaks of diarrheal illnesses. Even though this was the only variable found significant, others must also be important since 38% of the subjects denying consuming food from street vendors were also infected. We could not verify the accuracy of this information and it reflected only current practice, but it did not negate that food from street vendors could have been consumed by the subject in the past. Unfortunately, because of the questionnaire design, we could not

implicate any specific food item from street vendors in the transmission of the infection. Interestingly, the consumption of fruits showed a significant negative association (or protective effect) with the rate of infection among the subjects that reported not to have eaten food from street vendors. Fruits that are peeled shortly before consumption are specially recommended for travelers as a means to decrease the risk of acquiring intestinal infections. A recent study among children in rural Colombia also found consumption of fruits negatively associated with *H. pylori* infection. However, these investigators had a different interpretation of their data, hypothesizing that antioxidants (e.g., vitamin C) in the fruits might protect against acquisition of the infection.

The association between consumption of chili and the prevalence of *H. pylori* infection was specifically investigated because it is common belief in some regions of Peru that those who eat chili are prone to develop peptic ulcer disease. On initial analysis a marginal association was found, but it became nonsignificant when the analysis was adjusted for age. This finding, however, does not necessarily negate an association since, as mentioned before, aging per se does not lead to infection but must be a marker for other

factor(s). One important characteristic of *H. pylori* is its ability to change into a coccoid form that might allow the organism to survive under adverse environmental conditions. Spicy, seasoned foods are known to provide a medium unsuitable for most enterobacteria; however, to our knowledge, the survival of *H. pylori* has not been investigated. Evidence from previous studies have favored a role of water in the transmission of the infection. For example, *H. pylori* has been found to survive in water and saline for more than 10 days.¹⁵ Also, studies undertaken in Lima have implicated water from extradomestic sources in the acquisition of the infection, and *H. pylori* has been detected in drinking water.⁸ Our study specifically inquired about consumption of untreated water, home-made popsicles (usually prepared with untreated water) and extradomestic sources of drinking water, and did not find an association with the variables. Uncooked vegetables have also been implicated in the transmission of the infection, as recently reported in Chile⁷ and Colombia. In our series, consumption of vegetables (mostly uncooked) was not identified as a risk factor.

Further studies might be necessary to elucidate these issues. Food items that involve cooking (e.g., beef, fish, chicken, and beans) or industrial processing (e.g., milk and cheese) were consistently not associated with infection. The effect of socioeconomic status could not be evaluated in our study since all children were similar for those variables. Crowding, measured as the number of occupants per room in the household, was not a risk factor of infection in our study. This is in contrast to other reports in which households with more than one person/room were found infected more frequently. We believe that overcrowding in our study population (78% of the families reporting one person/room) might have obscured any possible effect of this variable. Finally, the recent isolation of *H. pylori* from the gastric mucosa of cats⁵ raised the possibility of a zoonotic reservoir in the transmission of the disease. However, neither our study nor others have found an association

between contact with domestic animals and acquisition of the infection.

The findings in our study are subject to a number of potential limitations that should be mentioned, some inherent to the case-control cross-sectional design used. The population studied was selected from hospital outpatients with chronic abdominal complaints, and they might not be representative of the overall population. The dietary information was collected by recall and referred to current practices, which might not be pertinent to an infection acquired some time in the past. Although the dietary variables were chosen because they represent most common food items among the study population, we might have missed some important variables or failed to control for interactions between the variables.

CONCLUSION

Despite these limitations we believe our findings support the role of food prepared under unhygienic conditions as a probable mechanism of transmission of *H. pylori* in developing countries and identify food from street vendors as probable sources. However, the specific food items, including water, could not be elucidated from this study.

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